LEAN 101

Using Measurements - Takt Time

TAKT TIME: *Takt time is the pace at which the customer is demanding/buying a particular product or service. It is the rate (time) at which a person/item/document/ action, etc. needs to be served or completed at each step in a process in order to meet customer demand, in order for work not to pile up. It is the actual work "touch" time and is* *independent* *of the number of people doing the work.*

It is simply the number of work minutes in a day, a week, or other chosen time frame, divided by the number of units of work to do (demanded by the customer) in that same time period. Takt time is not how long it takes to perform a task. It is used in Lean as ***the rhythm or heartbeat of the process****, i.e., if the customer wants a service every hour, the program/office should feel the heartbeat of producing a service every hour. Takt time cannot be reduced or increased except by changes in production demand or available time to work.*

"Takt" is a German word for 'pace,' 'beat,' or 'rhythm'. Takt time is one of the 3 Elements of Just in Time.

Lean 101   Using Measurements: Takt Time

Lean = Meeting customer demand in a timely way

Takt Time is the pace or rhythm of work production needed to meet customer/client demand. It is the available work time in a specified time period/frame divided by the number of units of work needed/demanded in that same time frame. It takes into account any shifts worked and makes allowances for planned unavailable times (for team briefings, standup/standing meetings, breaks, planned maintenance, etc.).

Takt Time is a useful concept for balancing demand and supply/resources. It is simple to use where the demand rate is consistent and/or consistently known but can also be very useful where demand fluctuates and where the time resources are variable (staff come and go; there are interruptions, etc.).

$$\text{Takt Time} = \frac{\text{Available Time}}{\text{Customer Demand}}$$

Example: If your customer requires 100 units a day, the Takt Time in minutes for one work day (using 7.5 actual work hours) will be -

7.5 hours/100 units = 450 minutes (7.5 hrs. ✗ 60 mins.)/100 units = 4.5 minutes per unit

-OR-

Example: If you have 100 requests for service each day that you must address, Takt Time will be -

7.5 hours/100 service requests = 450 minutes (7.5 hrs. ✗ 60 mins.)/100 service requests = 4.5 minutes per request

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This means the specified unit of work needs to be completed/delivered every 4½ minutes. Therefore, every step/unit needs to be done/delivered every 4½ minutes. Every effort should be made to first identify and eliminate waste in order to equalize the actual time variations in each step within the process -- and then to balance the workload.

Steps to Calculate Takt Time

1. Calculate your demand,   i.e. what does your customer typically want every day/week/month.
2. Calculate your available time = working time minus regular 'non-direct' time (stand-up meetings, breaks, vacations, sick time, cleaning, etc.). This is simply the work time in the time period selected, regardless of the number of people actually doing the work.
3. Calculate your Takt Time: Divide the available time by the demand.

Remember the Following in Determining Takt Time

1. Determine the appropriate time frame/time period for the process and step you want to look at. For example, consider the following:
   - How long should people wait? If you don't want people waiting even a day, then a day might be appropriate.
   - The process itself may suggest the appropriate time period. (i.e. if the process is repeated weekly, then weekly might be appropriate).
2. Be consistent and use the same time frame/period for the measurements. For example, staff time *per week* / # of units of work *per week*.
3. When determining staff time in the process (value stream) in the period chosen:
   - Allow for vacations, sick time, breaks in staff time. For example, the number of minutes in a work week is 2400, which -- taking such exclusions into account -- becomes 1886 actual work minutes available per week.
4. In balancing workloads, consider the proportion of time staff are working in any particular process/value stream. Staff may be involved in more than one process. For example, a full-time employee may only be available .25 FTE for the process you're considering – or you may also need or be able to balance workloads among processes, not just steps within one process.

How You Can Use Takt Time

1. Compare current worker cycle time against Takt Time.
2. Identify steps to rebalance work and, if necessary, adjust the amount of work so each employee has a full job. This avoids the build up of Work in Process or waste due to waiting.
3. Consider the inputs each worker receives to do the work and take steps to adjust these to match Takt Time.
4. Regularly (each week in most cases or whatever the appropriate time period is for your process) recalculate your Takt Time to ensure it reflects current circumstances and adjust staffing levels accordingly.

How Using Takt Time Can Help You

- Takt Time can provide the underlying "rhythm" for the work process. This helps to make the process and outputs more consistent and predictable/reliable, with all the workers responding to that same rhythm.

- It provides clear and immediate feedback for the worker. This is important not only for performance and problem identification but can also act as motivation for change.

- It provides information that can be used to balance work flow and workload, as well as the resources required to do the work.

Takt Time (Hypothetical) Examples

Takt Time: The rate (time) at which a person/item/document/ action, etc. needs to be completed at each step in a process in order to meet customer demand/for work not to pile up. It is the actual work "touch" time and is <u>independent</u> of the number of people doing the work. It is simply the number of work minutes in a week, or other chosen time frame, divided by the number of units of work to do (demanded by the customer) in that same time.

Calculation: <u>Time Available</u>_____ = **Time per item**
                 # Items/Documents/Actions/People

_____

Example: There are 11,018 claims that come into your unit each week. You have 27.5 staff to process these claims. What would be the pace at which each claim has to be processed in each step to meet the demand in a timely way?

   <u>1,886 work minutes a week available (1 FTE)</u> = .17 minutes for each claim
   11,018 claims per week

A claim would have to be processed roughly every 10 seconds in (each step of) the process in order to have no backlog (meet customer demand) for that week.

Staffing Needs: You can now use this Takt Time to help you determine the actual number of staff you need to do each step in order to meet customer demand (with no backlog) for the selected time period.

Calculation: <u>Cycle Time (the time it really takes/piece)</u>
                 Takt Time (the time demanded/piece) = **Minimum Number Staff Needed**

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Example: However, in Step 3 <u>each</u> claim takes 9 minutes, not the .17 minutes demanded by time and volume. Given this, how many staff do you actually need in Step 3 to do the work, with no backlog, to meet customer demand for the week?

   <u>9 actual minutes in Step 3</u>
   .17 available minutes   = 53 FTE staff

This means that you need roughly twice times the number of staff you currently have available for that Step in order to have no backlog for the week. You should always <u>first</u> determine if the current 9 minute cycle time can be reduced by streamlining the step/process and by identifying and removing bottlenecks, inefficiencies, and other wastes, etc.

Determining Staffing/Resource Needs: You can also use Takt Time to balance the work load or to "right-size" your process.

Calculation: **Cycle Time (minus waste-the time it really takes per piece)**

Takt Time (the time demanded/piece) = **Minimum Number of Staff Needed**

Example: Each claim takes about 4 minutes in Step 2, not the .17 minutes required by time and volume. Given this, how many staff do you need to do the work in this step with no backlog in order to meet customer demand for the week?

4 actual minutes per claim in Step 2
.17 available minutes per claim   =   23.5 staff

This means that you generally will need about four fewer staff than you have available to work on claims in Step 2 for the week. As a result, you can explore other options for balancing work loads in other steps in the process or areas where additional staffing is needed, providing expanded or enhanced services, etc. See also examples below.

Balancing the Workload within the Process: You can also use Takt Time to balance the work load within the process itself. In order to get a claim out every .17 minutes, every step within the claim process should move a claim every .17 minutes.

Example: In order to prevent bottlenecks, each step along the process should put out one claim every .17 minutes. You study each step to determine how much time it takes each step to actually do to its part. You find that Step 7 is taking 5 minutes. An adjustment has to be made; but, after getting rid of waste, it still takes 4.5 minutes. If it's a matter of people (rather than equipment/other resources), is more staffing capacity needed at that step?

4.5 actual minutes per claim in Step 7
.17 available minutes per claim   =   26.5 staff

This means that you generally will need more staff capacity to work on Step 7 than in Step 2. As a result, you might want to explore options for balancing work loads, such as bringing in staff working on other steps that may take less than .17 minutes/where there are more staff than needed. But, note also that this step does not require all your available staffs' time.

Balancing the Workload within the Process: Let's look at a couple of other steps --

Example: Step 5 is taking 5 seconds and Step 9 is taking 4 seconds. There is a person on each of these steps.

.08 actual minutes per Step 5 claim
.17 available minutes per claim   = .47 staff

.07 actual minutes per Step 9 claim
.17 available minutes per claim   = .41 staff

Does there need to be a person on each of these steps, or can one person do both of these steps in less than .17 minutes? Can you do some cross-training and take one of the two staff and put that one person on both steps? And use the second person elsewhere where additional resources are needed?

Another Example of Takt Time: In this example, you cannot assume that you can accurately extrapolate this Takt Time to a full work week. You should also form the practice of routinely checking to see if and when Takt Time changes. There may, for example, be predictable fluctuations in the demand rate (e.g. highest number of demand on Monday, tapering off toward the end of the week).

Calculation: Time Available_____ = Time per item
          Takt Time (the time demanded/piece)

_____

Example: Unemployment applications with requests for new and continued compensation come in by telephone, by mail, on the web, and in person. In a week that contained a holiday, 12,441 requests were made.

1509 work minutes available/4-day week   = .12 minutes per request
12,441 requests for the 4-day week

Using 1,886 work minutes available for a five-day week, there would be 1509 minutes available to process these applications. An application would have to be processed every .12 minutes or roughly every 7 seconds from start to finish, at every step of the process, in order to have no backlog for that week.